Mathematical Reasoning Recommended Competencies

Possible Corequisite Topics	Student Learning Outcomes
The Corequisite at Scale Task Force offers the following *possible* topics of study for a mathematical reasoning, corequisite course. These topics include just-in-time learning of foundational skills and review of credit-bearing, course content.	The Missouri Math Pathways Task Force has determined the following Student Learning Outcomes as the minimum requirements of a credit-bearing, entry-level, college course in mathematical reasoning.

I. Proportional Reasoning

Students will draw conclusions or make decisions in quantitative-based situations using proportional reasoning. Specifically, students will be able to:

Possible Corequisite Topics	*Pathways Initiative Student Learning Outcomes*
• Simplify and evaluate algebraic expressions • Use order of operations • Use estimation • Simplify fractions • Write fractions/percentage in decimal forms • Find a percentage increase/decrease • Perform operations with fractions and decimals • Solve linear equations • Solve proportion equations • Solve linear inequalities	• Use ratios, proportions, rates and percentages to explain, draw conclusions, or make decisions. • Use units and unit conversions to explain, draw conclusions, or make decisions.

II. Statistical Reasoning

Students will read, interpret, analyze and synthesize quantitative data (e.g., graphs, tables, statistics, survey data, etc.) and make reasoned estimates and inferences. Specifically, students will be able to:

Possible Corequisite Topics	*Pathways Initiative Student Learning Outcomes*
• Find the slope of a line • Determine an equation of a line • Find the intercepts of a line and interpret their meaning • Substitute values and evaluate an expression • Use exponential notation and properties • Use radicals • Plot points in the Cartesian Coordinate System • Graph linear equations by plotting points • Use subscript and summation notation • Shade a described area	▪ Collect and organize data in graphs and tables. ▪ Use descriptive statistics to interpret and analyze quantitative data. ▪ Use probability to interpret and analyze quantitative data. ▪ Communicate statistical findings effectively.

III. Mathematical Modeling

Students will create, apply and use mathematical models to solve problems. Specifically, students will be able to:

Possible Corequisite Topics	*Pathways Initiative Student Learning Outcomes*
• Plot points in Cartesian Coordinate System • Solve a system of equations graphically • Translate phrases into mathematical expressions • Translate applications into equations • Solve linear inequalities in two variables • Graph exponential functions • Find the slope of a line • Use exponential notation and properties • Use logarithms and properties • Use order of operations • Simplify radicals • Evaluate complex expressions using technology	▪ Describe and contrast linear rate and non-linear rate through verbalization and writing. ▪ Create linear and exponential functions from quantitative data and explain the results. ▪ Interpret and analyze linear and exponential functions that model data.